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Uniqueness in Art Market: Specialization in Visual Art

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Uniqueness in Art Market: Specialization in Visual Art

Arzu Aysin Tekindor and Vicki McCracken[1]

"I have come to the conclusion that all my eccentricities, analyzed a posteriori, constitute the most sacred part of my personality. Nobody before me had the idea of painting a soft watch." -Salvador Dali

Abstract

This study investigates the relationship between the value of painting and the fame of the artist. We determine the artist's fame by the artist's style and objects which were significantly used in the artist's paintings. We present a theoretical model to support our analysis. The model is modified from Rosen (1974) to art auctions by using reservation price. A sample of impressionist and modern paintings from famous artists at auctions is analyzed using a hedonic regression model. The results show a significant relationship between style and market valuation as well as objects and market valuation. We also find that medium, provenance, signature, exhibition, literature, number of auctions, where the art was sold, artist's age when the painting was executed and gift play a significant role in the determination of the price of the painting. By including "Google" variable on the model, we find the effect of popularity on price.

PRELIMINARY AND INCOMPLETE: DO NOT CITE

Key Words: Art Valuation, Auctions, Hedonic pricing model, Reservation Price.

JEL: Z11, D44, D11, D12

[1] Tekindor: Washington State University, McCracken: Washington State University.
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1. Introduction

A painting can be considered as a financial asset for its potential future return and as consumption good for the utility it provides from its aesthetic value and artist's prestige. Both as an investment and as consumption, art has been the focus of economic research in recent years. This paper takes fine arts account in many economics concepts such as labor economics in terms of artist's attributes, consumer behavior by considering bids in art auctions and pricing by analyzing the value of paintings. We put an emphasis on importance of having a primary object and primary style for an artist and analyze the price of the painting by including presence of artist's attributes in the painting. We turn our attention to art history and focus on some specific artists who have played significant roles in art literature such as style and object matter. A good example would be Edgar Degas who is one of the most famous impressionists and his paintings with ballerinas and dancers are well known worldwide.

The paper is made up of three parts. After a short introduction to the literature of research on the economics of the visual arts in the first part, the second part sets out a basic model about consumption decision by considering specific characteristics of paintings. The art is a heterogeneous good- each item is unique. We use hedonic hypothesis for the theoretical model and hedonic pricing model for the empirical model. Also, this paper only focuses on tertiary art market which is international auction market. Tertiary art market is mostly in major art auction houses' power. In this market, art is produced by well-known artists and previously owned by collectors, dealers and museums. [2]

In the second part of the paper, we analyze if the behavior of a specific style of an artist and his/her specific objects ,such as an apple, a woman, violin and so on, in paintings are of

[2] Singer and Lynch (1994), "Public Choice in the Tertiary Art Market", Journal of Cultural Economics 18:199-216

special importance to the reservation price a consumer is willing to pay at a given income and utility. The specific questions in this paper are: Will value bid function increase in style and object? How will those characteristics of painting affect the consumption decisions? The model focuses on hedonic hypothesis which is that each good is differentiated by the set of its characteristics.

In the third part of the paper, by using hedonic pricing model, we show some empirical evidence with the data set which collected from two of the most famous auction houses, Christie's and Sotheby's. The data includes 15 famous artists such as Picasso, Degas and Matisse, and the auctions from 1998 to 2011. The sample selected for this paper includes the artists who live in 19th or 20th centuries. These artists should be very famous in a specific style and they must be known with specific objects. In other words, the hypothesis involves whether consumers care about the artists' style such as cubism or surrealism, or they just care about the brand, which is the name of the artist. Do the bidders at auctions want to have any Picasso's painting either to invest or for pleasure or do they want to have a Picasso's cubist painting with abnormal shapes? Do they want to have any Degas's painting or do they want to have Degas's ballerina/dancer painting? The empirical model will show if those characteristics affect to actual prices at auctions in territory market.

We also include the artist popularity effect measured as Google hits for each artist, to analyze the effect of this characteristic on the price of an art work. In other words, the number of Google hits provides key information for the evaluation of artist's fame and helps to examine if there is any fame effect on the price rather than just effect of characteristics of the painting.

2. Art Economics

Art economics is considered a part of cultural economics (Blaug, 2001). Art, by definition, is a heterogeneous good- each item is unique. It is a durable good. Art can be defined as a private good but it can be also a public good. Knebel (2007) "There are *search goods*, where the quality is clear before the act of consumption, and there are *experience goods*, where prior use is necessary in order to evaluate the quality." The quality of some kinds of art can be defined, like performance art. It is hard to put value on a painting by observing quality before the act of consumption. However, Hutter (1992) argues that the previous owners of a painting affect the value of the painting. In other words, having information about who owned the painting before and the history of the painting is an important factor for pricing. Hutter's main point here is that the higher the art historic value, the higher the demand. Moreover, the other descriptions and classifications of art are credence good, consumer and capital goods, collector's good, merit good and superior good.

Throsby (1994) categorizes the art markets; 1) Primary market: small galleries, provincial auctions, dealers and artists. There is unlimited supply in this market and it is competitive. 2) Secondary market; private individuals, companies or small museums. There is monopolistic competition. 3) Tertiary market: international auction market. The art is produced by well-known artists. It is a monopolistic competition as well.

Coffman(1991) mentions "asymmetric information" in art markets. It is much more difficult and costly to establish the value of old paintings found in an attic. Many people cannot tell the difference between paintings and photomechanical reproductions of paintings (Towne, 1969). By considering the types of art markets and today's speed of information, we do not consider asymmetric information in our model as a problem for the tertiary markets.

Singer and Lynch (1997) distinguish three phases of the development of a major art movement. These phases depend on the art historians; founders (who created the style), followers, artists who are following the main stream art movements (not well-known artists). In addition to Singer and Lynch's classification of art movements, Frey (1997) came up with ex-ante and ex-post. His point concerns prices and rate of returns. Pesando (1993) highlighted the importance of location of auction houses. He showed that Picasso's paintings were auctioned at a higher price in New York than in London. He also finds price differences among action houses in the same city. Frey (1997) says the economic studies of the art market distinguish two different sources of return or utility of holding art objects.

Rengers and Velthuis (2002) focus on the primary rather than the secondary market for art. They looked at gallery prices instead of action prices. They also analyze determinants of prices rather than the rate of return on art as an investment. They claimed that all empirical studies so far are based on ordinary regression analysis to estimate determinants of prices. To them, this technique assumes that no hierarchy exists in the data (works of art, artists and galleries). For that reason, they use multilevel rather than ordinary regression analysis. In their analysis, they analyze not only the relation between size and price for all artists but also the relation between the average price-level of an artist and his/her marginal price for extra centimeters. They expect that aging has a positive effect on the selling price. Also, they indicate the effect of the residence of artists on the price of his/her painting. They conclude that artists who live and work abroad are a signal of quality and charge higher price than local artists. They used a base-line model, fixed effect model that includes explanatory variables at each of the three levels (works of art, artists and galleries) and random effect model in which the relation between price and size differs between artists.

"No sales" takes place when the bid price is below the seller's reserve price. Ekelund, Ressler and Watson (1998) say "Auction houses usually tell potential sellers that the reserve price is 80 of the low presale price estimate. This may indicate that the reserve price is easily determined by observing the low price estimate." Ekelund, Ressler and Watson (1998) determine if there is a bias in the auction house estimates in Latin-American Art. They found that the size of the painting has no predictable effect on price.

Ashenfelter and Graddy (2003) have theoretical and empirical research on strategic behavior in auction. In their research, they also discuss the mechanics of art auctions. One of the rules of auction is that action houses charge commissions to buyers and sellers. The total sale price to the buyer is thus the sum of the hammer price (the final price for the item in the auction) and the buyer's premium (around 10-17.5 percent of hammer price). Sellers also pay commission to the auction houses (10 percent of hammer price). Moreover, Ashenfelter and Graddy discuss how art asset prices can be measured over time (time-series movement). They use a hedonic model with repeat-sale models include a dummy variable for each painting. Using repeat-sales data on impressionist art, they checked if there were any differences in prices and estimates for paintings that came to auction and did not sell during their first appearance at auction, but sold during their second appearance at auction vs. those that came to auction sold during their first appearance and were resold again during their second appearance at auction. They found that the future value of a painting that goes unsold at auction is negatively influenced. They also discuss "secret reserve prices". The reason for using secret reserve prices is to deter collusion.

Knebel (2007), in his thesis, used Google to obtain information about the amount of media attention attracted by an artist and how the public response to this attention. One of the variables in his data is "count of total hits for artist at Google for search in English". Knebel gives examples about hits such as biographical pages, information about exhibitions, information

about the latest sales, excerpts from printed articles and so on. Knebel states that this is the first time that popularity data has been used in this way in with the fine art market and artists.

In the work by Hutter, Knebel, Pietzner and Schafer (2007), two major hypotheses were considered; Hypothesis 1: "*Prices for the works of living artists increase steadily over their lifetime, while auction prices for works by the same artist show no such strict pattern.* Hypothesis 2: "a) *The aggregate price level in dealer markets is higher than in auction markets for works by the same artist.* b) *The dealer price index follows upward movements but not downward movements of the auction price index".* They found that prices increase with age in a nonlinear pattern. Moreover, auction prices are lower than dealer prices and the price increases due to age are lower in auction markets.

Our paper contributes to the existing literature since we focus on the specific characteristics of painting, style and object, in order to identify their effects on price. In addition, we also find significant results about gifted paintings and paintings which has been auctioned several times in the past.

3. The Model

3.1 The Consumption Decision for Paintings – Reservation Price

A painting can be described by a number of characteristics which all contribute to the value attached to the complete art. The model developed for this research focuses on a hedonic hypothesis which is that each good is differentiated by the set of all its characteristics, $z_i (i = 1, 2, 3..n)$. This model depends on product differentiation and addresses the questions which concern the behavior of style and object in paintings at auctions are of special importance to the

reservation price a consumer is willing to pay at a given income and utility. The specific question is: Will value bid function increase in style and object?

The first assumption of the model is that buyers purchase only one painting of an artist with a particular value of set z. The strictly quasi-concave utility function is represented as $U(k, z_1, z_2 ...., z_n)$ where k is consumption of a numeraire non-painting good by assuming that price of all other goods is normalized to 1, z is painting. It follows that

$$\frac{\partial U(k,z)}{\partial z} > 0 \quad \text{and} \quad \frac{\partial U(k,z)}{\partial k} > 0 \tag{1}$$

i.e, the utility function is increasing in *z* and *k*. The budget constraint is represented as

$$m = k + p(z) + \rho \tag{2}$$

where m is income and ρ is buyer's premium. Auction houses charge a fee known as a Buyer's Premium. This is added to the winning bid (hammer price) and is part of the total purchase price and hence part of the budget constraint.

The buyer will reach utility u (uniform utility level) and the payment or the reservation demand price, $\theta(z_1, z_2, ..., z_n; u, m)$, under the condition of

$$U(m - \rho(\theta) - \theta, z_1, z_2, ..., z_n) = u \tag{3}$$

where $\theta(z; u, m)$ is consumer bid function which is the reservation price a bidder is willing to pay for values of the set of all characteristics of painting, z_i.

If the bidder wins the bidding and buys the painting, then $z = 1$ and the utility is $U(m - \rho(\theta) - \theta, 1)$. If the bidder does not buy the painting then the utility is $U(m, 0)$. The bidder buys the painting if $U(m - \rho(\theta) - \theta, 1) \geq U(m, 0)$.

After setting up the utility for consumers for the general characteristics of painting, specific utility function can be defined with z_1 and z_2 for object and style, respectively. Then, the reservation price a bidder is willing to pay for object and style is $\theta(z_1, z_2; u, m)$ when the other components of z are held constant.

The buyer's bid price function is derived by maximizing (2) subject to (3).

$$\frac{\partial \ell}{\partial z_1} = U_{z_1} - U_k \theta_{z_1} - U_k \rho_\theta \theta_{z_1} = 0\,, \qquad \theta_{z_1}(1+\rho_\theta) = \frac{U_{z_1}}{U_k} > 0 \tag{4}$$

$$\frac{\partial \ell}{\partial z_2} = U_{z_2} - U_k \theta_{z_2} - U_k \rho_\theta \theta_{z_2} = 0, \qquad \theta_{z_2}(1+\rho_\theta) = \frac{U_{z_2}}{U_k} > 0 \tag{5}$$

$$\frac{\partial \ell}{\partial u} = 1 + U_k \theta_u + U_k \rho_\theta \theta_u = 0, \qquad \theta_u = -\frac{1}{U_k(1+\rho_\theta)} < 0 \tag{6}$$

$$\frac{\partial \ell}{\partial m} = 1 - \rho_\theta \theta_m - \theta_m = 0, \qquad \theta_m = \frac{1}{\rho_\theta + 1} > 0 \tag{7}$$

Note that $\theta_{z_1}(1+\rho_\theta)$ and $\theta_{z_2}(1+\rho_\theta)$ are marginal rate of substitution between object and style, respectively, and the numeraire which is money for all other goods.

If the marginal utility of object is greater than the marginal utility of style, then consumers' utility is greater when the painting includes artist's object rather than the artist's style. We consider that the object is more specific with the artist than style. Owning a painting with an object which is known with a specific artist is more recognizable than the style.

Equation (4) and (5) shows that the bid price function (also known as the reservation demand price) is increasing in style and object. It means that the buyer is willing to pay more for the painting which includes artist's object and/or style. Also, equation (4) and (5) imply that $\theta_{z_1} > \theta_{z_2}$ when $U_{z_1} > U_{z_2}$. Therefore, the buyer is willing to pay more for object than style.

Alternatively, additional income increases maximum attainable utility. Equation (7) shows that the reservation demand price is increasing in income but at a decreasing rate with the buyer premium.

Finally, for the maximum utility, reservation price should equal to p(z). Then, a general hedonic model can be written as:

$$\theta(z^*;m,u^*)+\rho(\theta(z^*;m,u^*))=p(z^*)$$
$$\theta_{z_1}(z_1^*,z_2;m,u^*)+\rho_\theta=p(z_1^*)$$
$$\theta_{z_2}(z_1,z_2^*;m,u^*)+\rho_\theta=p(z_2^*)$$

3.2 Hedonic Pricing Model and Price Index

The evolution of art auction market has been studied in a number of previous papers. Two approaches have been used for analyzing art markets: repeat sale regressions and hedonic price regressions. According to Chanel (1996), hedonic models generally yield more reliable estimates than repeat sales. Chanel suggests that price indices of paintings should be based on regressions using the full set of sales, and not reseals only. They show that the standard deviations from the regression are an accurate measure of the precious with which indices over time are estimated by a hedonic regression.

Hedonic price function reveals information about the structure of the preferences of the consumers and shows the relationship between a product's price and its characteristics. The hedonic price function demonstrates how much a consumer has to pay to obtain different bundles of characteristics.

The most common econometric model used for art auction is hedonic pricing model. Onofri (2009) analyzes price of Old Master Paintings. Ashendfelter and Graddy (2003) estimate rates of returns and price indices by both using hedonic model and repeat-sale model. Czujack

(1997) examines the market of Picasso paintings sold at auction between 1963 and 1994 by using hedonic approach. Chanel (1995) and Gerard-Varet (1995) use hedonic models to construct price indexes of art.

We created 60 characteristic for each painting in the current study. We run a hedonic regression on the works sold. We estimate the following equation:

$$\log P_{rt} = \alpha_0 + \sum_{i=1}^{n} \alpha_i z_{ir} + \sum_{\tau=1}^{t} \beta_t w_{rt} + u_{rt}$$

Where P_{rt} is the price[3] of the painting r sold at time t, z_{ir} the ith characteristics of the painting r. i does not necessarily depend on t the year in which the painting is sold. w_{rt} is a dummy variable taking the value of 1 if the painting is sold in year t and 0 otherwise.

We use the logarithm of the price as a dependent variable[4]. By holding other characteristics constant, the coefficient of a dummy variable can be interpreted as the estimated percentage change in price due to the fact that the painting has the particular characteristic described by the dummy.

3.3 Data

The data set consists of prices and characteristic of 1103 paintings by worldwide major artists, auctioned and sold by Sotheby's and Christie's in New York, London and Paris between 1998 and 2011. Prices of paintings are in US dollars and include what is known as the buyer's premium. The information about paintings is made available by Sotheby's and Christie's online catalogue before and after the auction. These catalogues contains "estimated low" and "estimated high" prices which are produced by art experts such as art historians in the auction houses'

[3]For the international painting market we use the S&P 500 price index.
[4] Box-Cox test suggests the logarithmic transformation of the dependent variable.

departments. The data do not include any "bought in" (unsold) paintings and thus reflect only actual sales. If the hummer price is below the reserve price, the sale does not occur. The auction houses do not announce the items that were withdrawal, passed, or unsold in the auction. The information about those items is not available.

The selection process focuses on famous artists; Picasso, Dali, Munch, Klimt, Degas, Matisse, Cassatta, Miro, Kooning, Picebia, Chagall, Wassily, Hassam, Marc, and Magritte. The explanatory variables considered in this study pertain either the characteristics of the artists or the specific painting or auction. Specific variables in data are measured as follow.

1) *Artist*: We use 15 different dummy variables, one for each artist in the sample to indicate observations in the sample for that artist. Those artists lived in 19th and 20th centuries. The data also include the age of the artist when the painting was executed. This age range is from 16 to 95.

We use a dummy variable for the artist's style for each painting. For instance; Salvador Dali is well known with surrealism, Degas, Cassatt and Hassam with impressionism, Munch with expressionism and Chagall with symbolism. Picasso is famous with cubism. "Style" is a dummy variable taking the value 1, if the painting was painted with the artist's primary style.

Another dummy variable is used for object which is well known with the artist. For instance; Klimt is well know with using erotic women in his paintings. Magritte used apples, pipes and some other object in his paintings. Cassatt mostly focused on mother and child paintings. Dali is known with melting clocks, Gala (his wife) and sticks. Much inspired by death, illness (sick people) and darkness. Hassam's best known paintings are the "flag" paintings. "Object" is a dummy assuming the value of 1 it the paintings has the artist's primary object or objects.

We also use Google hits for artists' full names. Google is the dominant search engine in the United States market, with a market share of 65.6%.[5] The total number of hits registered by Google has been used by many academic researchers. According to Knebel (2007), the information on the number of Google hits per search word is used as an approximate measure of the popularity of each artist. Hits on Google show the web pages related with the artists. The information in these web sites can be anything about the artists such as paintings, biography, auctions, sales, blog comments and any historical information. Figure 1 shows the artists in our data and their prices and rank trends (number of Google hits).

<Figure 1 here>

Pablo Picasso: Picasso is one of the most well-known artists in the world and a co-founder of Cubist movement. Google also provides support for this: Picasso is the most popular artist in our data in terms of the number of Google hits. He had eight different working periods. We ignore these periods in our models and only consider Cubism as his style.

Salvador Dali: The greatest known Surrealist artist is the world famous Salvador Dali. [6] He is the most famous representative of Surrealist movement.

Rene Magritte: Magritte's earliest oil paintings were impressionistic in style. He tried Cubism and became famous with Surrealistic style. He is mostly well known with the objects he used in his paintings such as pipes, apples and clouds.

Gustov Klimt: Klimt once said *"All art is erotic*".[7] His immensely erotic portraits and sexually-charged sketches are refined and remain among the most recognized works of art in the world.[8] He has very unique style.

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[5] "comScore Releases November 2009 U.S. Search Engine Rankings". December 16, 2006. Retrieved July 5, 2010.
[6] http://www.surrealism.org/
[7] http://www.artistas-americanos.com/biography/klimpten.html
[8] http://www.iklimt.com/, 11/30/2011

"In 1897 Gustav Klimt founded with other artists the Vienna Secession and became its first president. By that time Klimt had developed his own and characteristic style, which should became the trademark of the movement. Like impressionism, also art nouveau was an international revolt against the traditional academic art style."[9]

Henri Matisse: The leader of Fauvism was Henri Matisse. Matisse's paintings are recognizable in terms of colors and patterns. Fauvist paintings have usually bright, row and unusual colors. He usually painted women figures.

''His varied subjects comprised landscape, still life, portraiture, domestic and studio interiors, and particularly focused on the female figure."[10]

Willem de Kooning: Kooning is an abstract expressionist. He is one of the best representatives of this style. His women series are on the list of the most expensive paintings in the world. [11] He usually painted on very big canvases.

''Kooning's paintings were not only shocking for their perceived hostility towards women, which is subject to debate, but also because de Kooning focused on the human figure at a time when art world dogma praised abstraction almost exclusively."[12]

Marc Chagall: Chagall created the art forms of Cubism, Symbolism and Fauvism. Later on, the influence of Fauvism made him to rise to Surrealism.[13] He focused on village life and mostly goats, bride-groom and cows.

Edgar Degas: There is no doubt that Degas is one of the most famous impressionists. His ballerina/dancer paintings and also sculptures are exhibited all around the world in very famous museums.

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[9] http://www.artelino.com/articles/gustav_klimt.asp, 11/30/2011
[10] http://www.metmuseum.org/toah/hd/mati/hd_mati.htm, 11/30/2011
[11] http://www.technology.am/the-30-most-expensive-paintings-of-all-time-141346.html 12/01/2011
[12] http://edu.warhol.org/app_dekooning.html, 12/01/2011
[13] Lewis, Michael J. "Whatever Happened to Marc Chagall?" *Commentary*, October, 2008 pgs. 36–37

"He is regarded as one of the founders of impressionism_although he rejected the term, and preferred to be called a realist."[14] *"He is especially identified with the subject of the dance, and over half his works depict dancers."* [15]

2) *Painting*: In our data, we have 26 different variables define the painting characteristics, such as medium, number of previous owners, size, executed date, signature, exhibition, gift to first owner, estate of the artist, style of the painting such as realism, cubism, fauvism, expressionism, impressionism and abstract.

The dummy variable, style, shows if the painting was painted by the artist's primary style. Also the dummy variable, object shows if the painting has the artist's primary object. We also have an interaction term which indicates if the painting has both style and object of the artist. Figure 2 shows the mean prices for the paintings which are categorized by having a style, object, both and none.

<Figure 2 here>

3) *Auction houses*: The data set was collected from two of the most famous auction houses, Christie's and Sotheby's. The type of the auction is "English" or "ascending price" auctions. Bidding starts with a low price and is raised as progressively higher bids until the bidding stops. The final price is called "hummer price". If the bidding does not reach its secret reserve price, the item will go "unsold". The unsold item is rarely bought by the auction house.

Auction houses' income is commissions from both seller and buyer. In our impression, Christie's and Sotheby's increase their buyer premium rate simultaneously. According to Ashenfelter & Grebby (2002), in some cases, the seller may pay no commission and even be

[14] *Gordon and Forge 1988, p. 31 .*
[15] *www.edgar-degas.org/*

guaranteed a minimum sale price. This may be a consequence of competition between auction houses. We use a dummy variable for each auction house and a dummy variable for each city of sale; London, Paris and New York.

4) *Time variable*: We introduce a dummy variable for each year of sale. We consider only sale year. Additional to time variable, we also include the periods of recession in U.S., U.K and France. This variable shows the effect of recession on the price.

< Table 1 here >

Table 1 shows descriptive statistics for the data. The most expensive painting in the data belongs to Picasso. It was sold for $104,000,000 in 2004 at Sotheby's auction house. The least expensive painting is from Cassatt with the price of $6,000. The greatest negative difference between the auction price and estimated high price released is a Matisse painting in 2010 with -$14,900,000. This indicates that the highest expert's valuation for this painting was almost $15 million more than resulting price. Moreover, the greatest difference between the lowest estimated value for one of Matisse's painting and its actual price was almost $5 million in 2010 in Christie's auction house. This shows that this painting was sold $5 million less than what it was expected to be at least. The resulting prices of Matisse's paintings are more surprising than those of other artists' paintings in the data. Another example supporting this conjecture is that the greatest positive difference between the price and the highest estimated price is $29,900,000 again for Matisse's painting in 2009 at Christie's' auction house.

The relationship between S&P 500 price index and the price trend of art is demonstrated in Figure 2.

<Figure 3 here>

Results

In this paper, a hedonic model is estimated to analyze the art market. Results from OLS estimation are displayed in Table 2 and Table 3. According to the Table 2, the resulting equation explains 65% (R^2=0.65) of the total variation in painting prices.

Oil on canvas is the most expensive combination. To be able to compare the medium of paintings, the dummy variable representing watercolor is excluded from our regression model (i.e. perfect multicollinearity). For this reason, the estimated coefficients for the type of surface measures the impact of the specific surface relative to watercolors. The results show that pencil is not statistically preferred to watercolor paintings. In other words, the media watercolor, drawings and other types such as crayon ("other type of medium" variable) generate lower price than in oil. We found that prices are increasing with surface. The dimension of painting has an effect on the resulting price but this effect is very small (0.01%). The sign of the variable "dimension square" shows that the size effect on price weakens the larger the painting is.

We tested that number of owners who owned the painting before, has positive effect on the price. This increases the price by 8.5%. However, estate of the artist has no statistically significant effect on price. The number of auctions of painting until its last auction date has a significant effect on price. In particular, one unit increase in number of auctions results in a 15% decrease in price, all else constant.

Moreover, we found that if the painting was a gift to the first owner or if it was an exchange between two artists, then the resulting price was 29% lower than otherwise. This shows that buyers think that paintings that were given away by its artist are not as precious as the paintings which were sold to its first owner. Age of an artist when the painting was executed has

a positive effect on the selling price but with a decreasing rate. The effect of age is tempered somewhat by negative coefficient for age squared. The result shows that every year increase in age of an artist adds %5.2 more onto the price.

We found that sale at Sotheby's auction house has a positive effect on price. Also, price obtained in New York is more expensive than sale in Paris. Signature, Literature and Exhibit are indicators of prestige. Our regression shows that if the painting has these prestige characteristics, this increases the price of the painting. For example, the signature of a painting has a positive effect of 50% on the resulting price.

The economic cycle is an important explanatory factor of demand for art works. Our estimation suggests that recession has a relevant effect upon the total purchase price of a painting. Not surprisingly, recession decreases the prices of works of art. In other words, it decreases demand on art work and causes a price drop. We found that during the recession in the U.S., U.K, and France the price of the painting decreases 34% all else constant.

Table 2 also shows the ceteris paribus comparison of the impact of artist on price, in the coefficient indicatory the comparison of Mary Cassatt (based category) and other artists. [16]Also, we compare realist paintings with other styles; impressionist, cubist, fauvist, expressionist, abstract surrealist paintings and undefined paintings which have not specific style.

We use the logarithm of Google hits as an independent variable. A positive sign for the Google hit would show that popularity of an artist is important for the resulting price at auction market for famous artists. This conjecture is confirmed with highest significance levels (1%) with a factor of 0.38 which means that 1% increase in popularity (Google hits) results in a price increase of 38%.

[16] Picasso is omitted from the regression because of collinearity. Since the artist has a single value for the Google hits, hence the estimating eliminates one more of the artists.

<Table 2 here>

The interaction variable of object and style measure the differences in change of price for the object when the painting has also artist's primary style. With a negative influence of 0.29, it is shown in Table 3 that having artist's primary object and style together has less influence on the resulting price. F-test (significant at the 0.05 confidence level) for the marginal effects of style and object on price shows that coefficient of style and the coefficient of object are not the same. Therefore, we conclude that consumers are willing to pay more for the object than for the style. That is, the effect of the object is statistically greater than the effect of style on the price. Regarding to our theoretical model, our hypothesis is accepted.

<Table 3 here>

4. Conclusion

This paper focuses on artists' specific styles and objects which made them different and recognizable in the art world and analyzes effects of these characteristics on price.

We have tested for the significance of several factors which are expected to influence the price of paintings of some famous artists who lived in 19th and 20th centuries. We have used a relatively homogenous cross-sectional data consisting of modern art paintings. We found that primary style paintings of an artist are more expensive. Also, presence of primary object of an artist increases the price of the painting. The hypothesis which states that consumers' utility is more when the painting includes artist's object rather than the artist's style. That is, the buyer is willing to pay more for object than style. By using hedonic regression, we found that effect of object is statistically greater than the effect of style on the price.

In addition to effects of style and object, we also found significant results about gifted paintings and paintings which has been auctioned several times in the past. The number of auctioned times of the painting has a negative significant effect on price. The more the painting has been sold at auctions, the less the price was sold for. This might be the reason of attainability. If a painting was on the market several times before, this shows that the painting is easy to attain and this decreases the price of the painting. If the painting was a gift to the first owner or if it was an exchange between two artists, this affects the price in a negative way. In the bidder's point of view, the gift shows the artist's valuation on the price. It is a signal of preciousness which was assigned by artist for the gifted painting. Also, by using Google hits, we show that popularity has also a positive effect on price.

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Figure 1 Mean price of artists and artists' rank trends

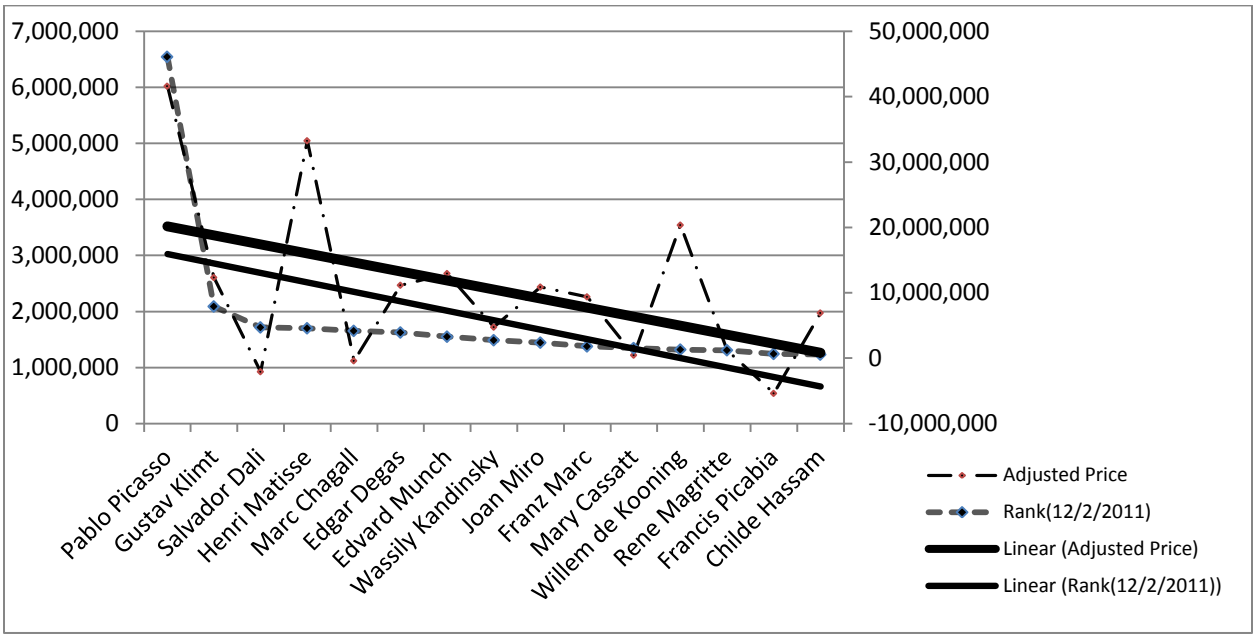

Figure 2

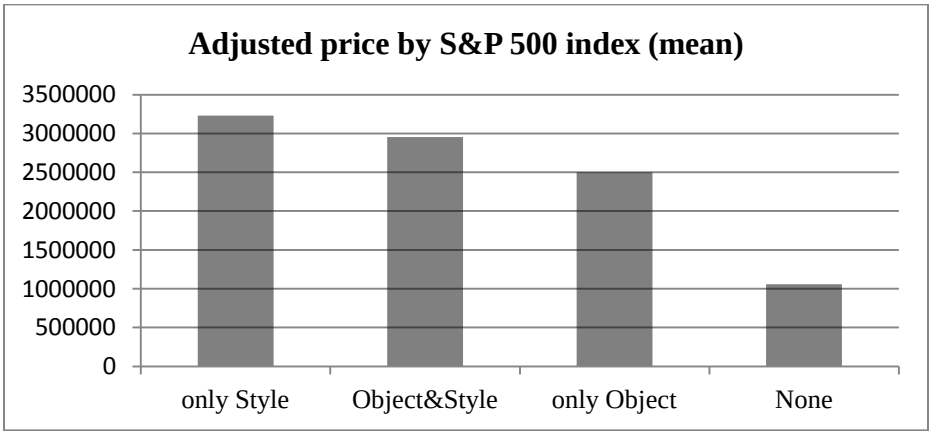

Table 1 Description of the variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Auction Price	1103	2,395,895	6,327,637	6,000	104,000,000
Adjusted Price (S&P 500)	1103	2,594,039	6,890,730	6,107	121,000,000
Estimated Low	1095	1,339,635	2,708,050	2,845	24,000,000
Estimated High	1095	1,885,045	3,783,837	4,268	30,000,000
(Auction Price-Estimated Low)	1094	749,783	2,236,685	-4,909,500	31,000,000
(Auction Price-Estimated High)	1090	502,254	1,918,587	-14,900,000	23,900,000
Executed year	1055	1932	29	1855	1987
Age of painting	1050	75	29	16	154
Provenance	1051	4	2	1	14
Number of auctions	1054	0.5	1	0	6
Artist's age (executed)	1055	53	17	16	96

Figure 3 S&P 500 price index and the price trend of art

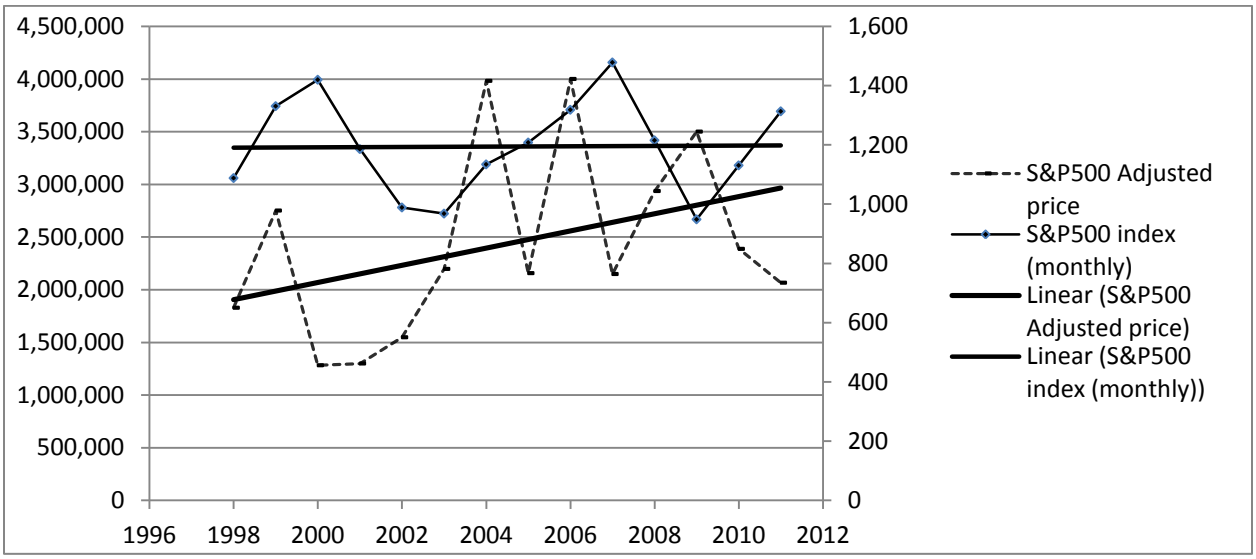

Table 2 OLS

ln(Auction Price)	Coefficient	Standard Error
Painting (watercolor based category)		
Oil	1.0344***	0.1371
Pencil	-.4900***	0.1601
Other type of medium	.5212***	0.1491
Style	.3525**	0.1445
Object	.7723***	0.1472
Object & Style	-.2863*	0.1668
Paingting's age	0.0033	0.0057
(Paingting's age)^2	0.0000	0.0000
Number of Owners	.0854***	0.0207
Dimension (cmSquare)	.0001***	0.0000
(Dimension (cmSquare))^2	-0.0000***	0.0000
Number of Auctions	-.1508***	0.0523
Estate of the artist	-0.0732	0.1020
Gift to the first owner	-.2952**	0.1449
Literature	.4547***	0.0895
Signed	.5036***	0.1035
Exhibited	.3833***	0.0804
Auction House (London based category)		
New York	.2009**	0.0799
Paris	0.1297	0.1854
ActionHouse(Christie's=1)	-.1799***	0.0696
Artist (Mary Cassatt based category)		
Artist's Age	.0517***	0.0136
(Artist's Age)^2	-.0005***	0.0001
Picasso	(omitted)	
Dali	-0.3175	0.3487
Munch	.4567*	0.2686
Klimt	.7362***	0.2460
Degas	.3631*	0.2175
Magritte	0.387	0.4220
Kooning	.9713*	0.5119
Picebia	-0.3236	0.4139
Miro	0.5845	0.3716
Chagall	0.0122	0.2880
Matisse	1.0433***	0.2210
Wassily	.6920**	0.2808
Hassam	1.1812***	0.4170
Marc	-0.0077	0.4165
lnGoogle Hits (Popularity)	.3882***	0.0973
Painting Style (realism based category)		
impressionist	.3040*	0.1698
expressionist	.3843*	0.2001
surrealist	.5438***	0.2014
cubist	.5555**	0.2191
fauvist	.5922***	0.2235
abstract	-.4200*	0.2537
undefined	0.0567	0.1575
symbolist	-.5260*	0.2754
During recession	-.3419**	0.1426

Year (2011 based category)			
	1998	-0.2887	0.2958
	1999	-.6183**	0.3079
	2000	-.6762***	0.2565
	2001	-.5552**	0.2363
	2002	-.5089**	0.2379
	2003	-0.2679	0.2637
	2004	-0.2486	0.2299
	2005	-.3879*	0.2199
	2006	-0.038	0.2098
	2007	-.3872*	0.2040
	2008	0.2691	0.2275
	2009	0.3707	0.2273
	2010	-0.0664	0.2073
	_cons	3.0495	0.2958
Adj R^2	0.64		
Number of observation	1012		

******* significant at the 0.01 level , ** significant at the 0.05 level, *significant at the 0.1 level*

Table 3 The marginal effects of style and object on price

Style \ Object	**0**	**1**
0	0	0.7723
1	0.3525	0.8385